OPL 9712

Barcode Data Collector

OPTICON

Specifications Manual



All information subject to change without notice.

Document History

Model Number:	OPL 9712	**Specification Number:**	SS06071
Edition:	1	**Original Spec Number:**	SS06050
Date:	2007-02-05		

Limited Warranty and Disclaimers

PLEASE READ THIS MANUAL CAREFULLY BEFORE INSTALLING OR USING THE PRODUCT.

Serial Number

A serial number appears on all Opticon products. This official registration number is directly related to the device purchased. Do not remove the serial number from your Opticon device. Removing the serial number voids the warranty.

Warranty

Unless otherwise agreed in a written contract, all Opticon products are warranted against defects in materials and workmanship for two years after purchase. Opticon will repair or, at its option, replace products that are defective in materials or workmanship with proper use during the warranty period. Opticon is not liable for damages caused by modifications made by a customer. In such cases, standard repair charges will apply. If a product is returned under warranty and no defect is found, standard repair charges will apply. Opticon assumes no liability for any direct, indirect, consequential or incidental damages arising out of use or inability to use both the hardware and software, even if Opticon has been informed about the possibility of such damages.

Packaging

The packing materials are recyclable. We recommend that you save all packing material to use should you need to transport your data collector or send it for service. Damage caused by improper packaging during shipment is not covered by the warranty.

Trademarks

Trademarks used are the property of their respective owners.

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1. Abstract

This manual provides specifications for the OPL 9712 barcode data collector (hereafter referred to as "data collector").

2. Overview

This scanner uses laser technology. To start a scan, press the trigger switch. Do not allow the scanner to directly touch the surface of a barcode when scanning.

Operating the scanner via a trigger switch enables low-power operation and longer battery life.

Supported symbologies:

Linear (1D)	**2D**
JAN/UPC/EAN (WPC), incl. add-on	MicroPDF417*
Chinese Post	PDF417*
Codabar/NW-7	
Code 11	
Code 39	
Code 93	
Code 128: EAN-128	
Composite Codes*: UCC/EAN-128 (incl. CC-A/B/C)	
IATA	
Industrial 2of5	
Interleaved 2of5	
ISBN-ISSN	
Korean Postal Authority Code	
Matrix 2of5	
MSI/Plessey – UK/Plessey	
RSS (all, incl. CC-A/B*); RSS-14/RSS-Limited/ RSS-Expanded	
S-Code	
Telepen	
Tri-Optic	

* Require use of an external library.

Using the built-in clock function, you can add a time stamp to the scanned data.

The scanner uses rechargeable lithium-ion batteries, which can be charged by setting the scanner on its cradle (part number CRD 9722).

To transmit data between this product and a PC, use Bluetooth. Alternatively the cradle dedicated to this product (part number CRD-9723-RS232C) can be used.

Applications can be developed for this product using the Software Development Kit (SDK). Software can be developed in the C programming language. These development tools are available as accessories.

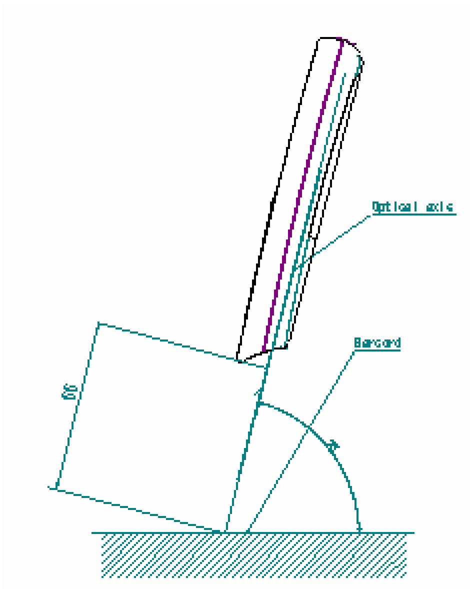


Figure 1: Reading a barcode.

3. Physical Features

3.1. Dimensions

W 129 mm x D 44 mm x H 22.3 mm

3.2. Weight

105 grams (with lithium-ion batteries installed).

4. Environmental Specifications

4.1. Operating Temperature and Humidity

Temperature: 0 to 40° C

Humidity: 20 to 85%

4.2. Storage Temperature and Humidity

Temperature: -20 to +60° C

Humidity: 20 to 90%

4.3. Ambient Light Immunity

Decoding performance is guaranteed when the range of illumination on a barcode surface is between zero and the following values:

Incandescent light	3,000 lx
Fluorescent light	3,000 lx
Sunlight	50,000 lx

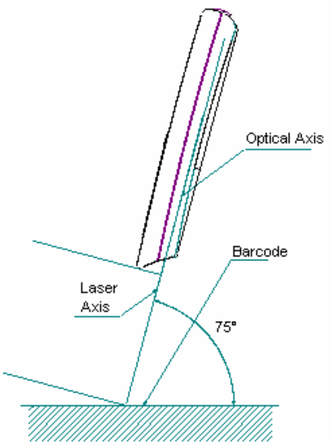


Figure 2: Ambient Light Immunity

Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

PCS:	0.9
Resolution:	0.25 mm
Symbology:	8-digit Code 39
Quiet Zone:	10 mm
N/W Ratio:	1:2.5

Direct light or specular reflection light from a source should be prevented from entering the acceptance area.

5. Electrical Specifications

Item	Specifications	Remarks
Main battery	600 mAh lithium-ion battery	
Main battery life	Rechargeable: 300 times	
Backup battery	3.4 mAh lithium-ion battery	
Current consumption	1 mA or less	At standby
	150 mA or less	When operating
Usable time	24 hours or more	1 scan/5s Without backlight, with Bluetooth communication
	50 hours or more	1 scan/5s Without backlight, no communication
Data hold time	72 hours or more	After main battery discharged

6. Functionality

Item	Specifications		Remarks
Control section	MPU	16-bit CISC CPU	Manufactured by Toshiba
	Clock frequency	14.74 MHz	
External memory	Flash ROM	512 KB	For BIOS/AP
	SRAM	512 KB	For WORK/DATA
Display section	LCD	Semi-transparent dot matrix LCD	
	DPI	112 x 64 dpi	
	Backlight	Installed	
	Functions	Clock time, battery power, failure notification, function settings	
Clock section	Real time clock	Counts year, month, date, hour, minute of the current time and corresponding to leap years	

7. Optical Specifications

Parameter	Specification	Unit
Light-emitting element	Red laser diode	-
Emission wavelength	650 ±10 (25° C)	nm
Light output	1.0 or less	mW
Scanning method	Bi-directional vibration mirror	-
Scanning speed	100 ±20	scans/s
Scan angle	Scan angle: 54 ±5	°
	Read angle: 44 (Min)	°
Resolution	0.15 or more	mm

8. Technical Specifications

The conditions for technical specifications are as follows, unless otherwise specified in each section.

Conditions

Ambient temperature and humidity	Room temperature (5–35° C) and room humidity (45% RH–85% RH)
Ambient light	500 to 900 lx
Background	Barcode = black Space = white Margin = white Background of label = black

8.1. Print Contrast Signal (PCS)

0.45 or higher (over 70% of reflectivity of space and quiet zone).

PCS is determined by: Reflectance of white bar – Reflectance of black bar / Reflectance of white bar

8.2. Scan Area and Resolution

The depth of field is measured from the edge of the data collector. The scanning range is within the circular arc centered on the scan origin.

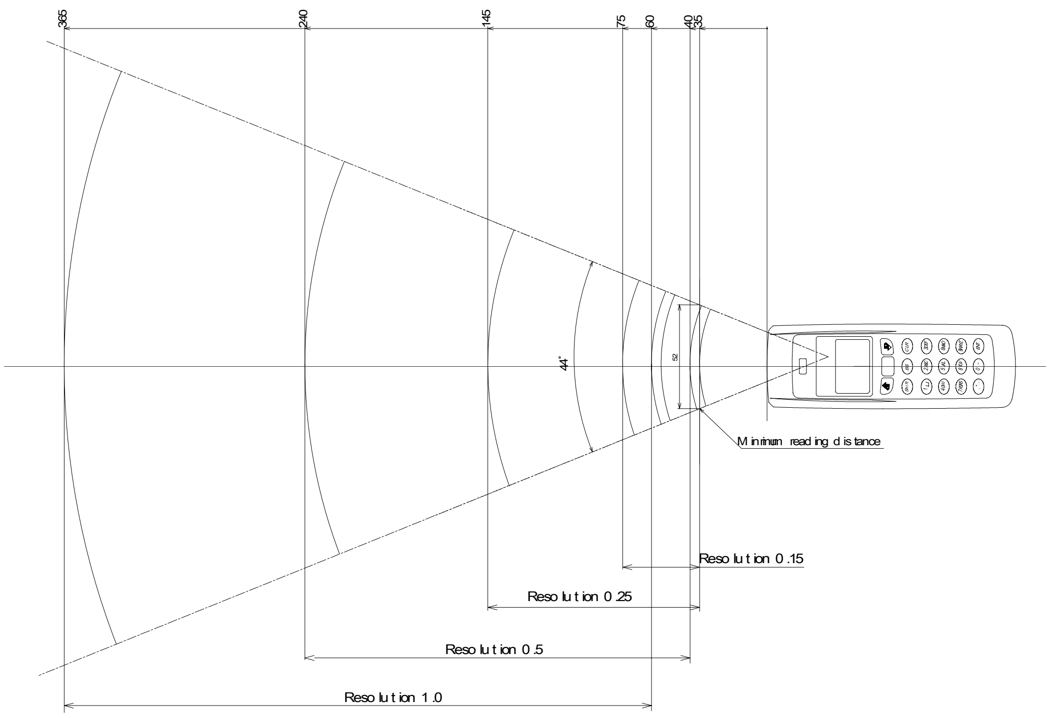


Figure 3: The depth of field

The depth of field is measured from the front edge of the data collector.

The scanning range follows a rectilinear path and expands in the shape of an arc while centering (focusing) on a distant virtual reference point.

PCS	Resolution (mm)	Decode Depth (mm)
0.9	1.0	60–300
	0.5	35–210
	0.25	35–120
	0.15	35–70

Resolution	Symbology	PCS	Digit
1.0 mm	Code 39	0.9	1
0.5 mm	Code 39	0.9	3
0.25 mm	Code 39	0.9	8
0.15 mm	Code 39	0.9	10

Conditions

Scan angle	54° (reading range is 44°)
Detect angle	40°
Barcode sample	Resolution 0.25 mm: OPTOELECTRONICS test sample. Code 39, 9 digits
Distance	Within 90 mm from the minimum scannable distance

Note: dirt or scratches on the mask will degrade scanning performance. Always handle the data collector carefully.

Barcode Sample: OPTOELECTRONICS Test Sample

N/W Ratio:	1:2.5
Angle:	$\alpha = 0°$, $\beta = 15°$, $\gamma = 0°$
Curvature:	$R = \infty$

8.3. Pitch, Skew, and Tilt

8.3.1. Pitch Angle

Scanning performance is guaranteed at α±25°.

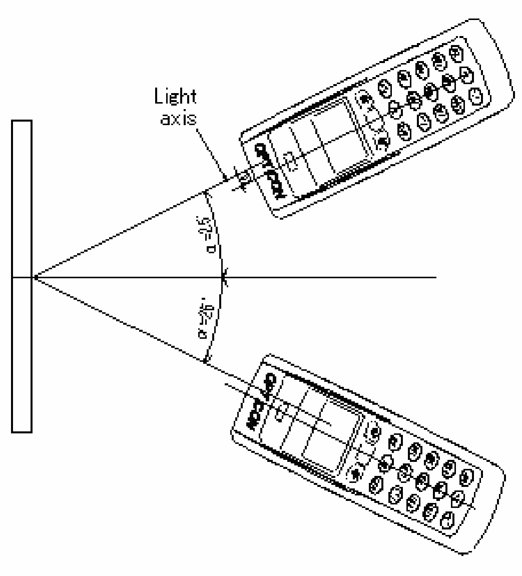


Figure 4: Pitch

8.3.2. Skew Angle and Dead Zone

Skew angle: β = ±50° (Excluding dead zone)

Dead zone: β = ±8° (There are some areas in which decoding fails due to specular reflection)

(Depth of field: Within 90 mm from the minimum scannable distance).

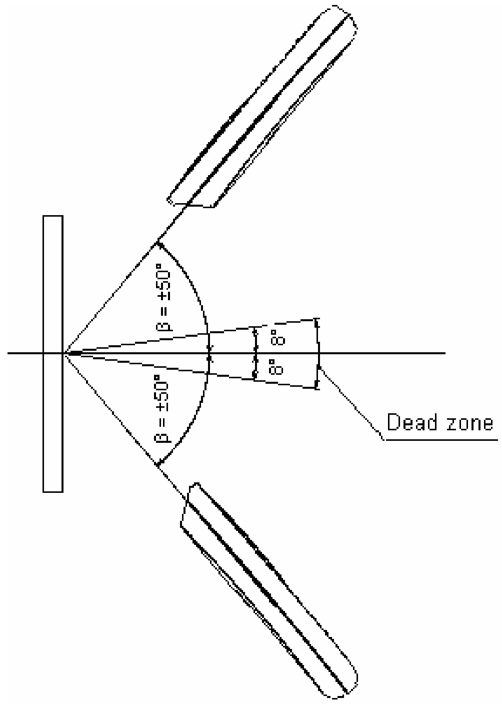


Figure 5: Skew and dead zone

8.3.3. Tilt Angle

Scanning performance is guaranteed when γ = ±20°

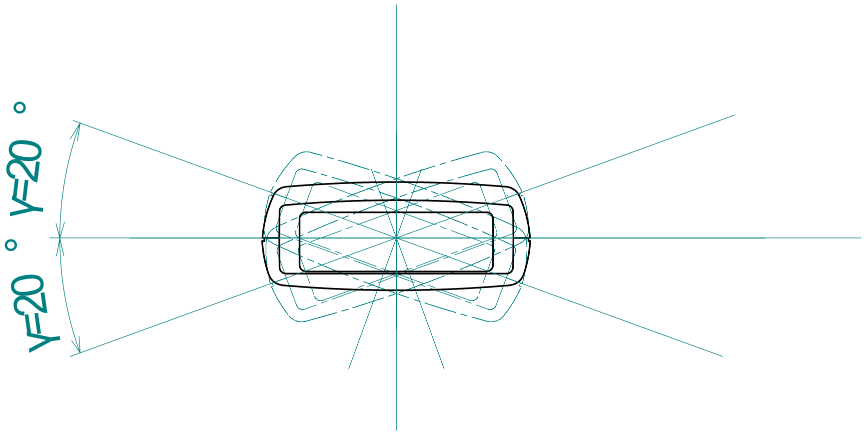


Figure 6: Tilt angle

Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

Distance:	90 mm from the edge of the data collector
Label:	**Pitch, Skew Angle** PCS = 0.9, Resolution = 0.25 mm, Symbology = 9-digit Code 39, Quiet Zone = 10 mm, N/W Ratio = 1:2.5 **Dead Zone, Tilt Angle** PCS = 0.9, Resolution = 0.26 mm, Symbology = 13-digit JAN, Quiet Zone = 10 mm
Angle:	Curvature: R = ∞, Skew Angle = β +15° (for measuring Pitch Angle and Tilt Angle)

8.4. Curvature

With 8-digit JAN/UPC/EAN barcodes, decoding performance is guaranteed when R≥15 mm.

With 13-digit JAN/UPC/EAN barcodes, decoding performance is guaranteed when R≥20 mm.

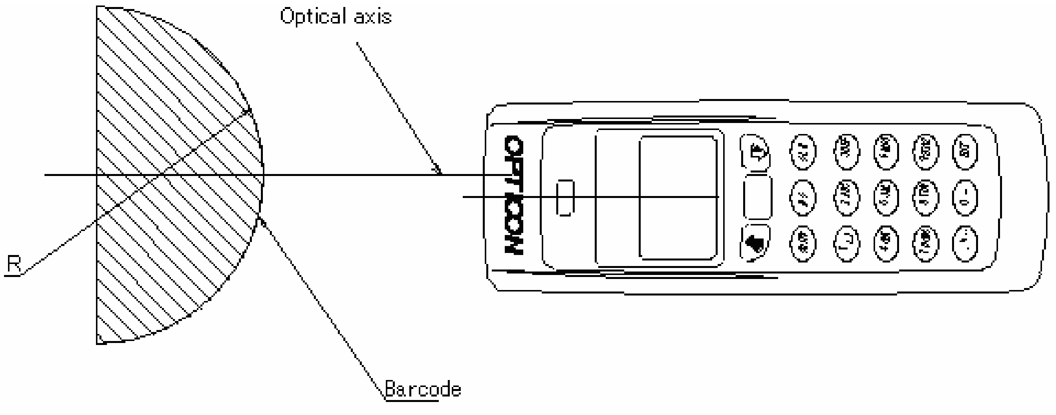


Figure 7: Curvature

Conditions

Barcode Sample: OPTOELECTRONICS Test Sample

PCS = 0.9, Resolution = 0.26 mm, Quiet Zone = 10 mm	
Distance:	90 mm from the edge of the data collector
Angle:	Skew Angle β = +15°

The scanning range will vary according to the depth of field.

9. Interface Specifications

9.1. Bluetooth Specifications

Bluetooth® is a registered trademark owned by its proprietor and used by OPTOELECTRONICS Co., Ltd. under license.

Feature	Description
Version [1)]	2.0
Supported protocol stack [1)]	RF (Radio Frequency Protocol) BB (Base Band Protocol) LM (Link Manager Protocol) L2CAP (Logical Link Control and Adaptation Protocol) SDP (Service Discovery Protocol) RFCOMM (serial port emulation)
Supported profile [1)]	SPP (Serial Port Profile) DUN (Dial-up Network Profile)
Communication configuration [2)]	1 to 1 – one OPL 9712 to one host system (Do not connect multiple scanners to one host system.)
Scanner operating mode while connected to the host system	Master or Slave mode
Security mode	Authentication enabled: These settings can be configured using menu barcodes.
Encryption	Encryption is linked to the authentication setting and cannot be enabled or disabled separately.
Communication range [3)]	Approximately 10 meters
Frequency	2400 MHz to 2483.5 MHz
Transmission power	2.5mW (4dBm) or less
Comm. range	10 m
Baud rate	115.2 kbps
Antenna	1/4λ (surface mounted)

Notes

1. The OPL 9712 complies with Bluetooth standards. The device that communicates with the OPL 9712 must support the same SPP. For other Bluetooth devices with other profiles we cannot guarantee a connection before the products have been tested.
2. The communication speed and range of the OPL 9712 may vary due to obstacles and radio wave conditions between the OPL 9712 and the device to which the OPL 9712 is connected. Conditions on the host device may also affect the communication speed and communication range of the OPL 9712.
3. The prospective distance may vary based on environmental characteristics. Also note the following frequency description.

9.2. Frequency

Bluetooth devices use the 2.4 GHz frequency band.

Scientific, medical, and industrial devices, including microwaves, wireless security (camera) systems and WLAN use the same frequency band as this scanner. Other radio stations also use this frequency for mobile object identification, including local private radio stations that require a license (for example, manufacturing lines at factories), specific power-saving radio stations requiring no license, and amateur radio stations.

Interference from other devices may affect the communication speed or communication range of this scanner or vice versa.

9.3. Infrared Transmission (IrDA)

9.3.1. Specifications

Thee CRD-9723 cradle enable the OPL 9712 to perform infrared transmission of data with IrDA Ver1.2 low power specification.

9.3.2. Transmission speed

Default transmission speed is set at 115.2 kbps. However, you can easily change the transmission rate to 57.6 kbps, 38.4 kbps, 19.2 kbps, 4.8 kbps, or 2.4 kbps.

10. Default Settings

10.1. Default Settings 1: Readable Codes

Symbology	Read	Transmit Code Length	Transmit CD	Calculate CD	Set Prefix	Set Suffix	Other
UPC-A	■	X	■	■	—	CR	
UPC-A Add-on	X	X	■	■	—	CR	
UPC-E	■	X	■	■	—	CR	
UPC-E Add-on	X	X	■	■	—	CR	
EAN-13	■	X	■	■	—	CR	
EAN-13 Add-on	X	X	■	■	—	CR	
EAN-8	■	X	■	■	—	CR	
EAN-8 Add-on	X	X	■	■	—	CR	
Chinese Post	X	X	■	X	—	CR	
Codabar / NW-7	■	X	■	X	—	CR	Not transmit ST/SP
Code 11	X	X	X	■	—	CR	
Code 39	■	X	■	X	—	CR	Not transmit ST/SP
Code 93	■	X	X	■	—	CR	
Code 128	■	X	X	■	—	CR	
EAN-128	X	X	X	■	—	CR	
IATA	■	X	■	X	—	CR	
Industrial2of5	■	X	■	X	—	CR	
Interleaved2of5	■	X	■	X	—	CR	
Korean Postal Code (Code 3of5)	X	X	X	■	—	CR	
Matrix2of5	X	X	■	X	—	CR	
MicroPDF417	X	X	—	—	—	CR	
PDF417	X	X	—	—	—	CR	
MSI/Plessey	■	X	■CD1	■CD1	—	CR	
UK/Plessey	■	X	■	■	—	CR	

Symbology	Read	Transmit Code Length	Transmit CD	Calculate CD	Set Prefix	Set Suffix	Other
RSS-14	X	X	■	■	—	CR	
RSS-limited	X	X	■	■	—	CR	
RSS-expanded	X	X	■	■	—	CR	
S-Code	■	X	■	X	—	CR	
Telepen	■	X	X	■	—	CR	
Trioptic	■	X	—	—	—	CR	Not transmit ST/SP

Notes:

- In the "Reading" column, "■" means "Enable reading" and "X" means "Disable reading."
- In the "Transmit code length" column, "■" means "Transmit code length" and "X" means "Do not transmit code length."
- In the "Transmit CD" column, "■" means "Transmit check digit" and "X" means "Do not transmit check digit."
- In the "Calculate CD" column, "■" means "Calculate check digit" and "X" means "Do not calculate check digit."
- "— " means "not supported."
- In the "Prefix" column, "—" means "there is no prefix setting."

11. Serial Number

The serial number shown on the right is written on silver matte with black paper affixed to the backside of the OPL 9712.

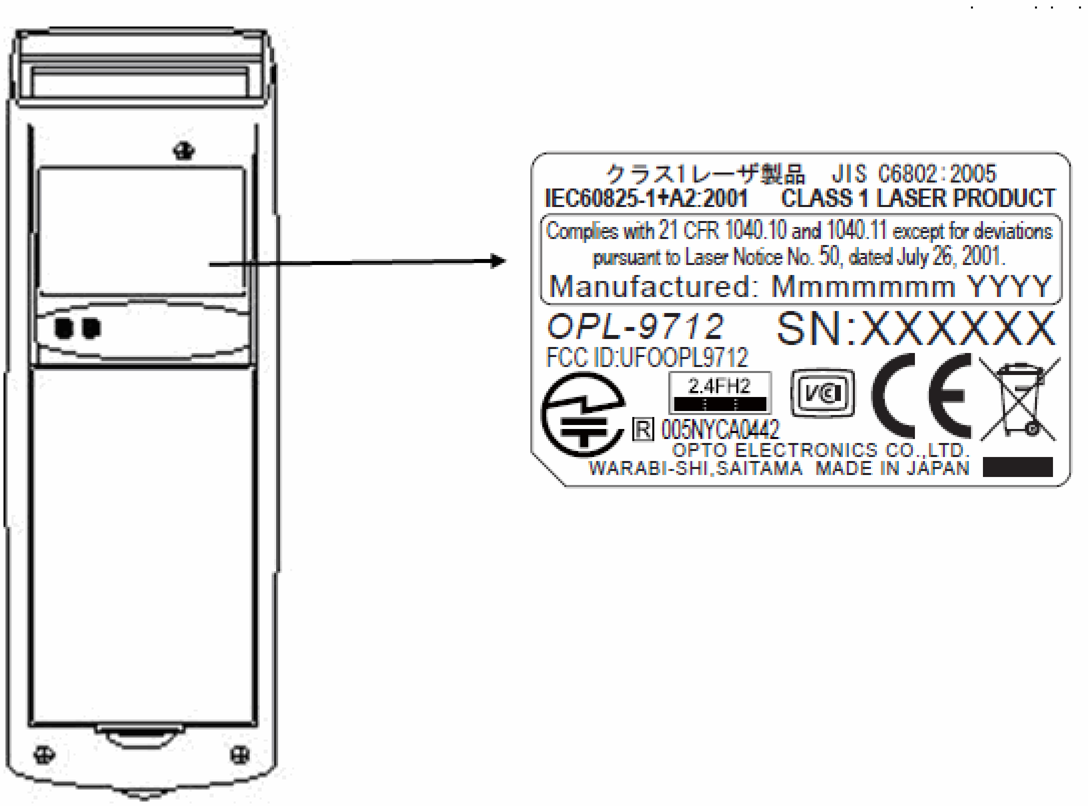


Figure 8: Serial number diagram

12. FCC Labels

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

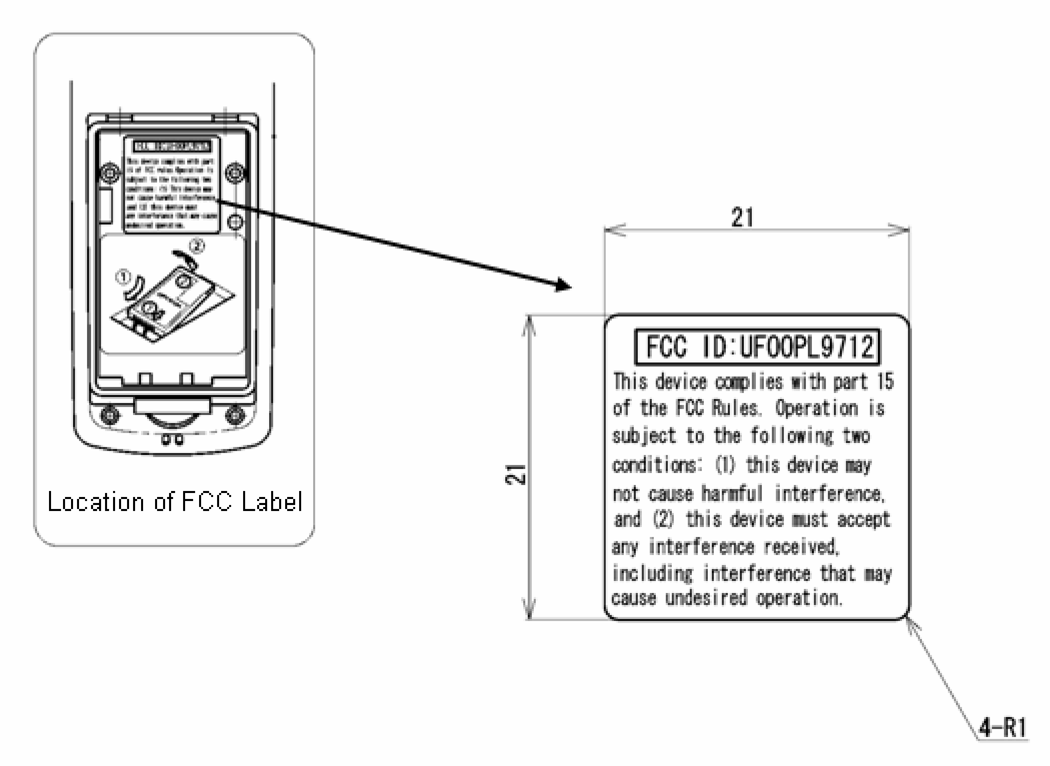


Figure 9: FCC label

13. Packaging Specifications

13.1. Individual Packaging Specification

Place the OPL 9712 in a protection bag E, and pack it in the provided box. Then place the accessories into the box.

Accessories:

- 1 lithium-ion battery
- 1 hand strap

Close the box and affix a label to the side of the box.

Size of the package (after assembly: 245 (W) x 112 (D) x 39 (H) mm

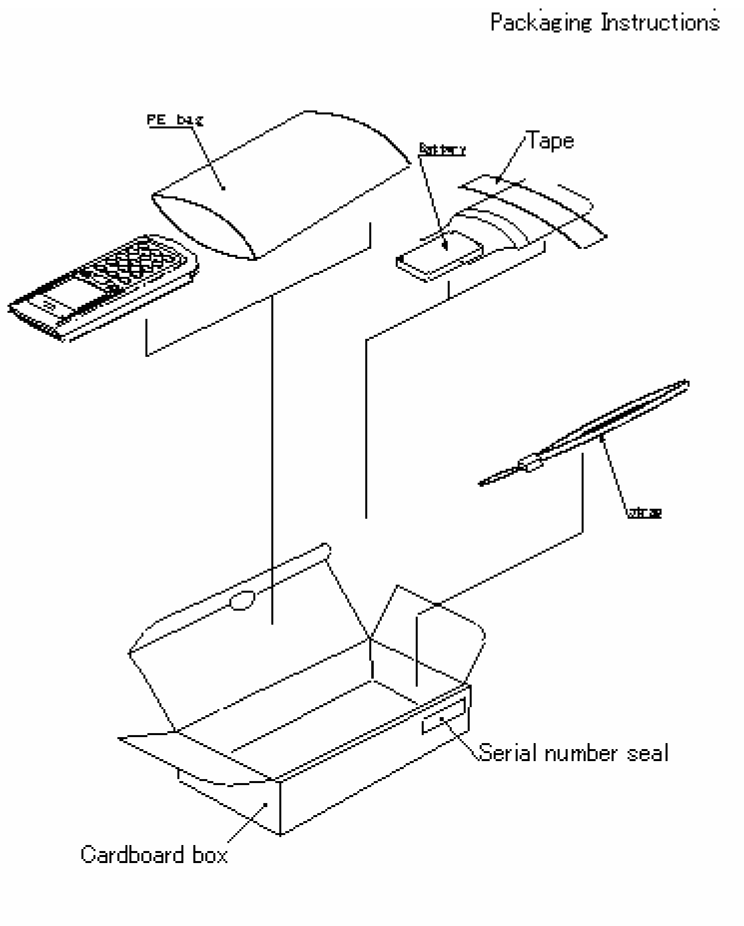


Figure 10: Individual packaging

13.2. Labeling

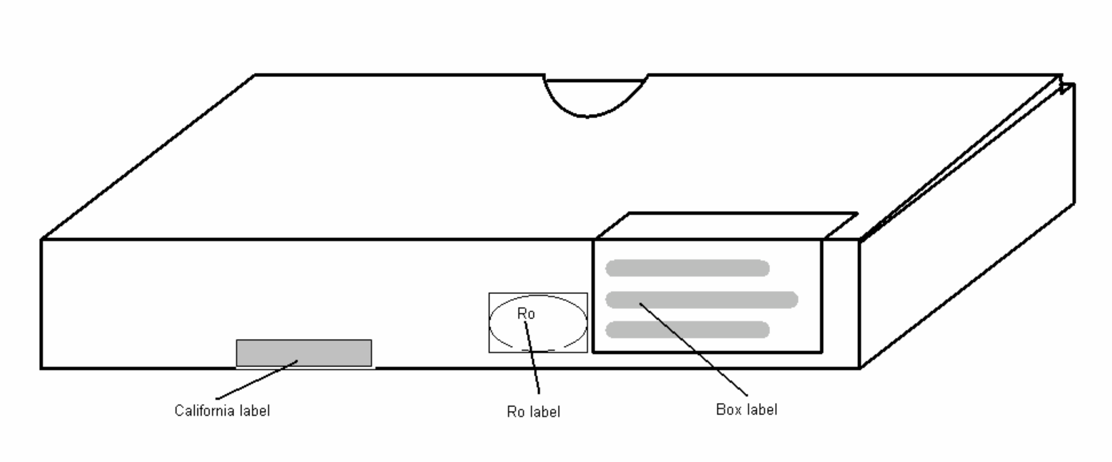


Figure 11: Labels

When packing 50 pre-packaged data collectors, select a box size equal to 560 mm (W) by 490 mm (D) by 195 mm (H).

Note: The “RO” mark labeled on the package tray or package box guarantees that the applicable product has passed our test of RoHS restrictions compliance (the restriction of the use of certain hazardous substances in electrical and electronic equipment, 2002/95 EC). However, this document does **not** have any legal weight in the European Union.

14. Durability

14.1. Shock

There was no damage to the data collector structure or data collector operation after dropping the data collector from a height of 1.5 meters onto a concrete floor. Each side of the data collector impacted the floor three times.

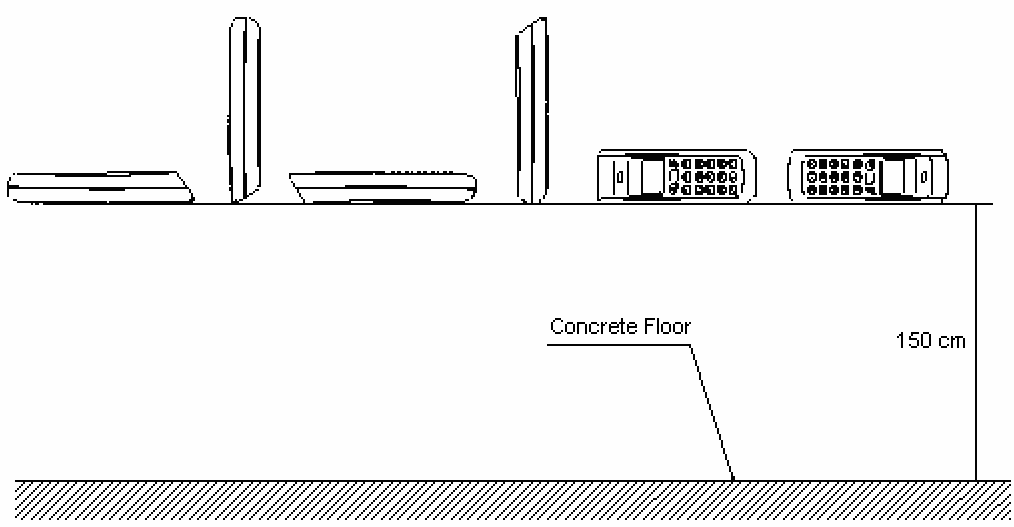


Figure 12: Shock test

14.2. Vibration Strength

No malfunction occurred after the following vibration test.

Vibration test: Increase the frequency of the vibration from 12Hz to 100Hz with accelerated velocity 19.6m/s2 (2G) for 6 minutes in non-operating state. Repeat this routine 10 times in each of X, Y, Z direction for a total of 180 minutes.

14.3. Dust and Drip Proof

IP 54

15. Reliability

MTBF (Mean Time Between Failures) of this product, except for the laser diode and the mirror motor scan unit, is 8 years.

MTBF of the laser scan engine (includes the life cycle of the laser diode and mirror motor) is 10,000 hours.

Keypad operating life: The keypad expected usability is 1,000,000 uses (cycles) when the key is pressed with 1 kgf force.

The estimate of MTBF is based on standard operation of the product within the recommended temperature range and without extreme electronic or mechanical shock.

16. Regulatory Compliance

16.1. Laser Safety

The data collector emits laser beams.

- JIS C6802: 2005: Laser class 1
- IEC60825-1: Laser class 1
- CDRH Laser class I. Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to laser notice No. 50 dated June 24, 2007.

Class 1 laser devices are not considered to be hazardous when used for their intended purpose. Avoid staring into the laser beam.

16.2. Product Safety

EN60950-1: 2001

IEC60950-1: 2001

16.3. EMC

EN55022

EN55024

VCCI Class B: This is a Class B product, to be used in a domestic environment based on the Technical Requirement of the Voluntary Control Council for Interference from Information Technology Equipment (VCCI). If this is used near a radio or television receiver in a domestic environment, it may cause radio interference. Please install and use the equipment according to the instruction manual.

FCC Part 15 Subpart B Class B

FCC Part 15 Subpart B Class C: This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC ID: UFOOPL9712

16.4. R&TTE

This scanner conforms to the following standards of the Radio and Telecommunications Terminal Equipment (R&TTE) directive from the EU.

EN300 328

EN301 489-1

IEC60950-1

EN60950-1

The scanner qualifies as radio equipment for low-power radio stations (2.4 GHz band advanced data communication systems) as specified in the Radio Law 38-24-1.

The scanner has obtained the Certification for Construction Design of Specified Radio Equipment. It does not have a radio station license in Japan.

The following activities are prohibited under the Radio Law:

- Remodeling and disassembly
- Peeling off the certificate label

16.4.1. Export Regulations

This product is subject to the strategically controlled exports regulated under Foreign Exchange and Foreign Trade Laws. Export of this product may require export permission from the Japanese government

16.5. RoHS

RoHS: The restriction of the use of certain hazardous substances in electrical and electronic equipment, 2002/95 EC

16.6. State of California: Perchlorate Best Management Practices

The batteries on some Opticon products may contain Perchlorate. To comply with California Perchlorate Best Practice Regulations and the Law for the Promotion of Utilization of Recyclable Resources (Japan), products that may contain Perchlorate materials should be properly labeled on the exterior of all outer shipping packages and/or in locations that otherwise satisfy the California Perchlorate Best Management Practices.

17. Safety

Handle this product carefully. Do not deliberately subject it to any of the following.

17.1. Shock

- Do not throw or drop the data collector.
- Do not place heavy objects on the cables.

17.2. Temperature Conditions

- Do not use the data collector at temperatures outside the specified range.
- Do not pour boiling water on the data collector.
- Do not throw the data collector into the fire.
- Do not forcibly bend the cables at low temperatures.

17.3. Foreign Materials

- Do not immerse the data collector in liquids.
- Do not subject the data collector to chemicals.

17.4. Other

- Do not plug/unplug the connectors before disconnecting the power.
- Do not disassemble this product.
- Do not use the data collector near a radio or a TV receiver. It may cause reception problems.
- The data collector may be damaged by voltage drops.
- The data collector may not perform properly in environments when placed near a flickering light, such as a computer monitor, television, etc.

18. Mechanical Drawing

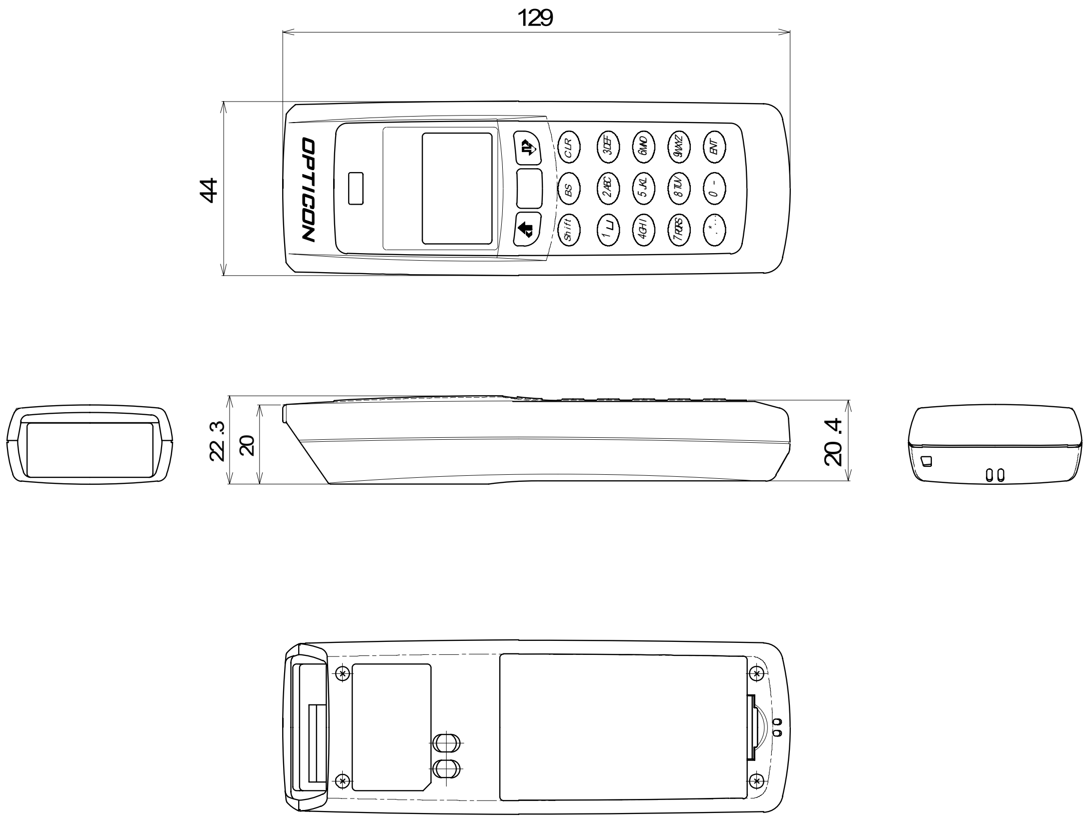


Figure 13: Mechanical drawing